REMARKS

This Response is submitted in reply to the Final Office Action dated October 28, 2010. Applicant respectfully requests reconsideration and further examination of the patent application pursuant to 37 C.F.R. § 1.113.

Summary of the Examiner's rejections

Claims 33, 50, 52, 55, 57, 60, 63, 66-69 and 73 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) further in view of Kanoaka (US 2003/0182617) and further in view of Sartori (US 2005/0048914).

Claims 34, 36-37, 53-54 and 61-62 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and further in view of Sim (US 7,236,591).

Claims 38-43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and further in view of Kostusiak (US 5,115,224).

Claims 44-49, 58 and 59 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and further in view of Applicant's admitted prior art (AAPA).

Claims 56, 64 and 70-75 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and Sartori (US 2005/0048914) and further in view of Khorram (US 7,130,601).

Claim 51 stands objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 65 was allowed.

Examiner failure to prosecute claims 66-75

The Examiner indicated in the Final Office Action's paragraph 3 that claims 66-69 where rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden, Zhu,

Kanoaka, and Sartori. However, the Examiner did not provide any comments as to why he believed claims 66-69 were not patentable. Hence, the Examiner has failed to prosecute claims 66-69. Since, the Examiner failed to prosecute independent claim 69 it follows that the corresponding dependent claims 70-75 were not prosecuted as well. Accordingly, Applicant respectfully requests that the Examiner withdraw the Final Office Action and prosecute claims 66-75.

Remarks regarding objected claim 51

Claim 51 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant submits that amended independent claim 33 (the base claim to dependent claim 51) is patentable over the cited art as discussed in detail below. Accordingly, Applicant respectfully requests the removal of this particular objection.

Remarks regarding the §103(a) rejections

Applicant respectfully submits that the pending independent claim 33 is patentable in view of Naden, Zhu, Kanoaka, Sartori or any combination thereof. The pending independent claim 33 recites the following:

> 33. A wireless relay based network, comprising:
> a first node;
> at least one relay station; and
> a second node;
> wherein said first node communicates with said second node via said at least one relay station, wherein each relay station is operative to:
> receive a digital communication from said first node;
> compute a plurality of reliability values for a plurality of symbols in the received digital communication, where each reliability value indicates how likely the corresponding symbol is a binary 0 or a binary 1; and,
> transmit a digital communication which has a plurality of symbols that are same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to said second node (emphasis added).

The presently claimed relay station addresses a problem in the prior art where the known relay stations made "hard decisions" on received signals that are fed forward

to the receiving device (see background section in present patent application). The claimed relay station addresses this problem by being operative to: receive a digital communication from a first node; compute a plurality of reliability values for a plurality of symbols in the received digital communication, where each reliability value indicates how likely the corresponding symbol is a binary 0 or a binary 1; and, transmit a digital communication which has a plurality of symbols that are same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to the second node. This has the desirable effect where the individual symbols in the transmitted signal are "labeled" with reliability values by the relay station without the need for the relay station to make any "hard decisions" on the received signal. Instead, the second node is allowed to take the reliability values for individual symbols into account in its processing of the received digital communication when making the "hard decisions" on the signal. However, it is clear that Naden, Zhu, Kanoaka, Sartori do not recognize this problem, let alone provide any teaching to the skilled person to arrive at the present invention.

Applicant agrees that Naden discloses the following claimed features: a first node; at least one relay station; and a second node; wherein said first node communicates with said second node via said at least one relay station, and wherein each relay station is operative to receive a digital communication from said first node. However, Applicant disagrees that Zhu, Kanoaka, Sartori disclose or suggest the following claimed features: wherein compute a plurality of reliability values for a plurality of symbols in the received digital communication, where each reliability value indicates how likely the corresponding symbol is a binary 0 or a binary 1; and, transmit a digital communication which has a plurality of symbols that are same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to said second node. A detailed discussion is provided next to explain the substantial differences between Naden, Zhu, Kanoaka, Sartori and the presently claimed invention.

In the Final Office Action, the Examiner combined Zhu, Kanoaka and Sartori to reject the "characterizing part" of the presently claimed invention namely the compute and transmit operations. However, the Examiner fails to recognize the "inventive

feature" associated with the compute and transmit operations wherein the relay node does not make hard decisions regarding the received digital communication but instead computes reliability values and then transmits the received digital communication signal along with reliability values to the second node which then uses the reliability values to make the hard decisions on the received digital communication (see claim 66 for specific reference to hard decisions).

In this regard, Zhu's relay node has a digital filter and makes hard decisions on the received signal because it filters the received signal and sends a "revised signal" to the second node. While, Kanoaka teaches the specific filter used in the present invention's relay node there is still no teaching where one skilled in the art would revise Zhu's relay node to include Kanoaka's filter to determine reliability values and then not use those reliability values to revise the received signal and forward the revised signal. This is because Zhu teaches where the relay node filters the received signal and sends a "revised signal" to another node. Sartori does not cure Zhu's deficiency and in fact Sartori has the same deficiency in that Sartori's relay resource also makes hard decisions on the received signal. In particular, Sartori discloses a relay resource configured to: demodulate and decode the transmission from the transmitter to provide decoded information; determine whether the transmission has been likely correctly received; re-encode the decoded information to provide re-encoded information; transmit the re-encoded information to the base site when the transmission appears to have been correctly received; and not transmit to the base site any relayed transmissions that would be based upon transmissions that were likely not correctly received (see paragraphs [0045]-[0050]—highlighted steps correspond to hard decision).

In view of the foregoing, Applicant submits that Zhu, Kanoaka and Sartori fail to disclose or suggest the claimed "transmit a digital communication which has a plurality of symbols that are same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to said second node". The secondary prior art Sim, Kostusiak, and Khorram do not correct these deficiencies. Accordingly, Applicant submits that the aforementioned substantial differences between the pending independent claim 33 and the cited prior art are

indicative of the patentability of the independent claim 33 and the corresponding dependent claims 34-51.

Referring now to the currently pending independent claims 52 and 60, Applicant respectfully submits that these claims are patentable in view of the cited prior art. The pending independent claims 52 and 60 each recite the same or similar distinguishing limitations that have been discussed above with respect to amended independent claim 33. As such, the aforementioned remarks regarding the patentability of the amended independent claim 33 apply as well to the amended independent claims 52 and 60. Accordingly, Applicant respectfully requests the allowance of the currently amended independent claims 52 and 60 and their corresponding dependent claims 53-59 and 61-64.

Remarks regarding non-prosecuted claims 66-75

Applicant respectfully submits that the pending dependent claim 66 is patentable over the cited prior art. The pending dependent claim 66 is as follows:

> 66. The wireless relay based network of Claim 33, wherein said at least one relay station by computing the plurality of reliability values for a plurality of symbols in the received digital communication and transmitting the digital communication which has the plurality of symbols that are the same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to the second node avoids having to make hard decisions on the plurality of symbols in the received digital communication, and wherein the second node makes hard decisions on the plurality of symbols in the received digital communication by taking into account the reliability values for the plurality of symbols in the received digital communication.

As can be seen, the pending dependent claim 66 recites a limitation "wherein said at least one relay station by computing the plurality of reliability values for a plurality of symbols in the received digital communication and transmitting the digital communication which has the plurality of symbols that are the same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to the second node avoids having to make hard decisions on

the plurality of symbols in the received digital communication, and wherein the second node makes hard decisions on the plurality of symbols in the received digital communication by taking into account the reliability values for the plurality of symbols in the received digital communication". The recited limitation indicates how the claimed relay station can efficiently avoid having to make "hard decisions" on a received digital communication in a manner that effectively addresses a problem with the prior art as discussed in the "Description of Related Art" section of the pending patent application. In view of at least the foregoing, Applicant submits that the pending dependent claim 66 is patentable over the cited prior art.

Referring now to the pending dependent claims 67-68, Applicant respectfully submits that these claims are patentable in view of the cited prior art. The pending dependent claims 67-68 each recite the same or similar distinguishing limitations that have been discussed above with respect to the pending dependent claim 66. As such, the aforementioned remarks regarding the patentability of the pending dependent claim 66 apply as well to the pending dependent claims 67-68. Accordingly, Applicant respectfully requests the allowance of the pending dependent claims 67-68.

Applicant respectfully submits that the pending independent claim 69 is patentable over the cited prior art. The pending independent claim 69 is as follows:

> 69. A wireless relay based network, comprising:
> a first node;
> at least one relay station; and
> a second node;
> wherein said first node communicates with said second node via said at least one relay station, wherein each relay station is operative to:
> receive a digital communication from said first node;
> compute a plurality of reliability values for a plurality of symbols in the received digital communication, where each reliability value indicates how likely the corresponding symbol is a binary 0 or a binary 1; and,
> transmit a digital communication which corresponds to the received digital communication but also has the computed reliability values <u>implicitly</u> embedded therein to said second node (emphasis added).

Applicant refers the Examiner to arguments made in the Amended dated March 23, 2010 for a detailed discussion about how Naden and Zhu or any combination

thereof failed to disclose or suggest this new independent claim 69 not counting the new limitation "implicitly embedded". Sartori does not teach the new limitation "implicitly embedded" (see paragraphs [0045]-[0050]). Kanoaka does not teach the new limitation "implicitly embedded". Instead, Kanoaka discloses a decoder that corresponds to a turbo encoder which performs a posteriori probability decoding (APP). Applicant also submits that Kostusiak does not teach the new limitation "implicitly embedded". In this regard, the Examiner has indicated that "Kostusiak teaches a personal security system network whereby each receiving transceiver will transmit a relay signal, which combines (i.e. embeds) the emergency signal with additional received-signal-strength indication (RSSI) information" (see paragraph 12 on page 7 of the Final Office Action). In particular, Kostusiak teaches a receiving transceiver which sends a relay signal that explicitly combines an emergency signal and RSSI information (see col. 3, line 1 through col. 4, line 22). Sim and Khorram do not correct this deficiency. In view of at least the foregoing, Applicant submits that the aforementioned substantial difference between the pending independent claim 69 and the cited prior art are indicative of the patentability of the pending independent claim 69 and the corresponding dependent claims 70-75.

Furthermore, Applicant respectfully submits that since the cited prior art fails to disclose or suggest the pending independent claim 69 then it follows that the corresponding pending dependent claims 70-75 are patentable as well over the cited prior art or any combination thereof. In the past, the Examiner has consistently cited Kostusiak to reject the pending dependent claims 38-43 and since the pending dependent claims 70-75 are similar to those claims the Applicants will repeat those arguments where it is explained in detail how Kostusiak does not teach or suggest the limitations recited in the pending dependent claims 70-75. Kostusiak teaches the following:

> A personal security system includes at least one movable transmitter adapted to produce an emergency signal transmission when activated and a plurality of transceivers adapted to receive emergency signal transmissions from the movable transmitter. The received strength of an emergency signal received by one of the transceivers is compared with the received signal strength of an

> emergency signal received by other of the transceivers, and an alarm signal is produced by a transceiver in response to receipt of a transmission whose signal strength is stronger than any other transmission signal strength to which it has been compared. The alarm signal may include a code identifying both the activated movable transmitter and the transceiver producing the alarm signal.

(see abstract).

The Examiner has indicated that "Kostusiak teaches a personal security system network whereby each receiving transceiver will transmit a relay signal, which combines (i.e. embeds) the emergency signal with additional received-signal-strength indication (RSSI) information" (see paragraph 13 of the pending Office Action). In particular, Kostusiak teaches a receiving transceiver which sends a relay signal that explicitly combines an emergency signal and RSSI information (see col. 3, line 1 through col. 4, line 22). Kostusiak's RSSI information is a single measurement which is based on the power of the received emergency signal. In contrast, the present invention's transmitted digital communication has implicitly embedded therein a plurality of reliability values which are based on the reliability of a plurality of symbols in the received digital communication. This is an important difference since the present invention can implicitly embed the reliability values in different ways to transmit the digital communication. For instance, the pending dependent claim 70 recites one way that the claimed relay station can use the plurality of reliability values to transmit the digital communication. The pending dependent claim 70 recites the following:

> 70. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication such that high reliability symbols are transmitted with higher power and low reliability symbols are transmitted with lower power to said second node.

As can be seen, the claimed relay station uses the plurality of reliability values to transmit the high reliability symbols at a higher power and the low reliability symbols at a lower power. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to transmit different parts of the emergency signal at different powers. Moreover, Applicant has defined "reliability

values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the pending dependent claim 71. The pending dependent claim 71 recites the following:

> 71. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to modulate an amplitude of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to modulate an amplitude of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to modulate the amplitude of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to modulate the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the pending dependent claim 72. The pending dependent claim 72 recites the following:

> 72. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to modulate a phase of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to modulate a phase of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to modulate the phase of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to modulate the relay signal. Moreover, Applicant has defined "reliability values" such that "each

reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the pending dependent claim 73. The pending dependent claim 73 recites the following:

> 73. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to vary a bandwidth of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to vary a bandwidth of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to vary the bandwidth of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to vary the bandwidth of the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the pending dependent claim 74. The pending dependent claim 74 recites the following:

> 74. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to vary a signal time occupation of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to vary a signal time occupation of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to vary the signal time occupation of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to vary the signal time occupation of the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a

binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the pending dependent claim 75. The pending dependent claim 75 recites the following:

> 75. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to vary a signal constellation size of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to vary a signal constellation size of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to vary the signal constellation size of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to vary the signal constellation size of the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. In view of at least the foregoing, Applicant submits that the aforementioned substantial differences between the cited art and the pending dependent claims 70-75 are indicative of the patentability of the pending dependent claims 70-75.

CONCLUSION

In view of the foregoing remarks, Applicant believes all of the claims currently pending in the application to be in a condition for allowance. Therefore, Applicant respectfully requests that the Examiner withdraw all objections and rejections and issue a Notice of Allowance for pending claims 33-75.

The Commissioner is hereby authorized to charge any fees for this paper to Deposit Account No. 50-1379.

Applicant requests a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,

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